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a still greater service to science reconciles me to the abandonment of a good deal of personal ambition." The same spirit breathes throughout his correspondence with Gauss, Schumacher, and other great leaders abroad, to whom he was wont to confide his projects and aspirations, and who sympathised with and counselled him in return. His letter-books are rich with similar illustrations.

And this brings us to another remarkable point about Dr. Gould's career. If we were asked to place the finger upon the epoch marking the birth, or regeneration, of American astronomy, we should feel inclined to name the date 1845 July, when Gould placed his foot upon the steamer from Boston with the avowed and definite purpose to devote himself to a life purely of scientific research. Up to that time the instance of a man doing this as his only earthly aim, while unassured of a professor's chair or similar appointment, and not as a means of livelihood, was in America absolutely unknown.

He inspired a new breath into American astronomy. The new atmosphere which he brought with him from Germany, where he caught the spirit of the great masters under whom he studied, became gradually transfused through the States. His enthusiasm for the introduction of better means and methods of research was caught by his compatriots, their courage in the effort to regenerate our science was sustained, and transmitted through various channels to the next and to the present generation.

Dr. Gould married, in 1861, Mary Apthorp Quincy, daughter of Hon. Josiah Quincy. She died in 1883. Her sympathy with and influence upon his life work may be most reverently spoken of by recalling the affecting lines of his dedication of the great Zone Catalogues: "This Catalogue of Southern Stars, the fruit of nearly thirteen years of assiduous toil, is dedicated to the beloved and honoured memory of Mary Apthorp Quincy Gould, to whose approval and unselfish encouragement the original undertaking was due, by whose sympathy, self-sacrifice, and practical assistance its execution was made possible, who bravely endured privation, exile, and afflictive bereavement that it might be worthily finished, but who has not seen its completion."

Dr. Gould received the degree of Ph.D. from Göttingen in 1848, and that of LL.D. from Harvard in 1885, and from Columbia in 1887. He was For. Mem. Roy. Soc. (London); For. Assoc. Roy. Astr. Soc. (London); Cor. Mem. Acad. Sci. (Institut de France); Acad. Imp Sci. (St. Petersburg); Kön. Akad. Wiss. (Berlin); Kön. Ges. Wiss. (Göttingen); Kais. Akad. Wiss. (Vienna); Bur. d. Long. (Paris). He also received the order Pour le Mérite from Prussia..

[For the above notice the Council is indebted to Mr. S. C. Chandler.]

Hugo Gyldén was born in Helsingfors, Finland, on 1841 May 29. The only son of his parents, he received from them the

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most careful nurture and education, which in his case brought a rich reward. After completing his university course, he went to Gotha, in 1861, that he might obtain from the illustrious author of the *Fundamenta Nova*, *Perturbations qu'éprouvent les Comètes*, *Zweckmässigen Methode die Störungen der kleinen Planeten zu ermitteln*, &c., a thorough acquaintance with the (then new) methods of the theory of perturbations. In 1862 he returned to Helsingfors to practise at the University as *docent*, but he soon left for Pulkowa, where he worked hard in the observatory till 1871. In that year he was called to Stockholm, being appointed Director of the Observatory of the Academy of Sciences; and this position he held till his death on 1896 November 9, in spite of flattering invitations to undertake the direction of other observatories—Helsingfors, Gotha, Göttingen, &c.

It is always of interest to study the history of a great man's work. In the case of Gyldén it is remarkable how, in spite of its diversity, a fundamental connection can be traced throughout. If we specially consider his researches on the groundwork of planetary theory, the logical order of the development is at once apparent. The methods of Hansen are devised especially to simplify numerical calculations in order to lighten the mechanical work in studying celestial motions. Gyldén's work in the first period bears traces of Hansen's influence—defining as the first period that in which he endeavoured to simplify the calculation of perturbations on familiar lines. The one investigation dealt with minor planets, the other with comets, the two together representing an attempt to simplify the problems of motion in orbits of moderate and large eccentricity. The valuable series of publications which resulted from these two inquiries is well known to astronomers. He treated the second most completely, and was thus led to complex mathematical researches, preparatory to the second period.

The unsatisfactory nature of methods hitherto known, all based on the Keplerian ellipse, had long ago attracted Gyldén's attention, and in the course of the above-mentioned investigations he devised the means of attacking the fundamental problem of the theory, the absolute orbits of the planets. The second period, which occupied the last 16 years of his life, was devoted to this problem. The principal results as yet published are the memoirs *Ueber die Convergenz*, &c., the *Nouvelles Recherches*, and the *Théorie des Orbites absolues*, vol. i. Of this last work vols. ii. and iii. are still to come. In the same connection Gyldén undertook an investigation on the planet *Hilda* and the satellite *Hyperion*, which are known to have analogous motions. To give details of this work here would take too long.

This is a brief indication of Gyldén's chief work, but his catholic genius did excellent work in other departments of astronomy. His researches on the rotation of the Earth and on stellar parallax are well known to astronomers. During his stay

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at Pulkowa he was charged with the vertical circle to determine the declinations of the Pulkowa fundamental stars, and this led to his devoting attention to various questions of stellar astronomy. A man of his stamp could not be satisfied with merely making the observations, which he regarded as merely the starting-point for real astronomical work. He undertook a discussion of the theory of refraction, which forms the basis of the Pulkowa refraction tables. His memoir in the fifth volume of the Pulkowa observations gives a faithful picture of him as a practical astronomer. Finally, to give some idea of his versatility, we may mention the regions in which he did and published work of more or less importance: the theory of the motions of planets and comets, mathematical analysis, the problem of rotation, stellar parallax and proper motion, theory of refraction, variable stars, cosmogony, popular astronomy, biography, philosophy. The number of his published works and memoirs exceeds 200.

The astronomical world will mourn Gyldén's death, not only because a distinguished man of science of whom much might yet be expected has been cut off in the prime of life, but also because he has been snatched away from his most important researches on planetary motion just as he was about to gather the ripe fruits of his labours. This refers more especially to the second and third parts of his *Théorie des Orbites absolues*, and to the application of his methods to special cases of motions of the minor planets and satellites, for it was here that we might look for the most important results of his work in revising the theory of planetary motion. Although it is believed that he has left the work in MS. so nearly complete that it can be edited and published with comparatively little trouble, still it can no longer come from his own hands, and herein lies the bitter sadness of Gyldén's early death. On the other hand, it may be stated with confidence that the method of investigation in the planetary theory initiated by Gyldén has been established on a firm and permanent footing. For this no better testimony is needed than the number and names of those who have studied Gyldén's theory. That which he strove for he in the main accomplished, and the accomplishment required not only all his skill, but all his own great energy.

Gyldén possessed in the highest degree those qualities which make a scholar in the true sense of the word. His lofty conception of science and its aims was an inspiration to those who had the good fortune to be intimate with him; personal intercourse with him was a perfect stimulus towards scientific activity.

[For the above notice the Council is indebted to Dr. O. Backlund, Director of the Pulkowa Observatory.]

CARL NICOLAUS ADALBERT KRUEGER was born on 1832 December 3 at Marienburg, in West Prussia. He was at school, first at Elbing, and later at Wittenberg. In 1851 he entered the Berlin University to study mathematics and science, and soon